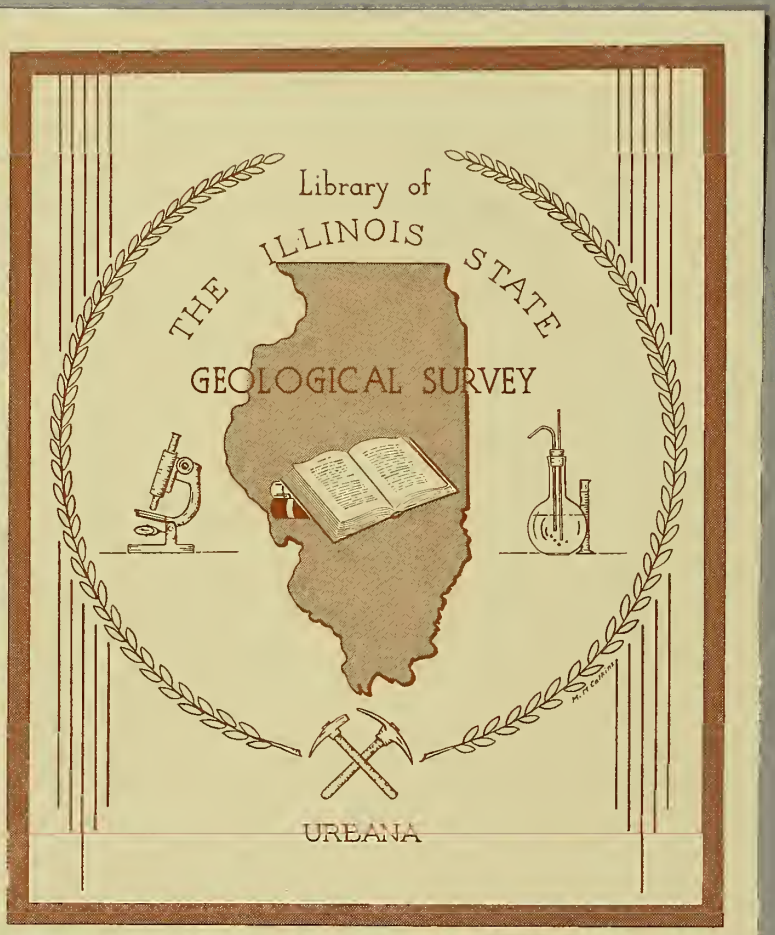

State of Illinois
Department of Registration and Education
Division of the
STATE GEOLOGICAL SURVEY
M. M. Leighton, Chief

INFORMATION CIRCULAR NO. 3

PRELIMINARY REPORT ON THE SAND AND GRAVEL RESOURCES OF THE BUDA QUADRANGLE

Compiled by
George E. Ekblaw

October, 1932

Illinois State Geological Survey
Urbana, Illinois

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SUMMARY

Sand and gravel deposits of more or less importance occupy most of the Buda quadrangle (Fig. 1). The most important deposits occur in (1) gravel hills south of Buda, (2) "broken country"--alternate hills and plains, some of which contain gravel--lying between Buda and Wyanet and extending north towards Manlius, and (3) plains of gravel occupying all of central, west, and northwest parts of the quadrangle. Deposits of lesser importance occur in the prominent ridge east of Manlius and in the terraces and plains along Bureau and West Bureau creeks. One commercial plant is located in the gravel hills at Burnett Switch and another in the "broken country" along the south bank of Pond Creek just south of Wyanet.

INTRODUCTION

The Illinois State Geological Survey has made a detailed study of the geology and mineral resources of the Buda quadrangle, and a report embodying the complete results of this study is in course of preparation for publication. However, numerous recent requests for information concerning the sand and gravel deposits in the quadrangle have made it desirable to prepare for immediate distribution a brief discussion of these resources.

This preliminary report is based largely on data collected by Dr. Paul McClintock, who made the complete detailed study of the quadrangle, and by H. A. Sellin, who covered the area in connection with a State-wide survey of local materials for secondary roads. Their data have been recently checked by a brief field inspection.

Description of Legend accompanying map (Fig. 1)

1 Gravel hills; largely or entirely gravel; exploited commercially.

2 "Broken country"; hills and small plains of gravel and till; considerably exploited; worthy of serious prospecting.

3 Outwash areas; gravel and sand more or less regularly distributed; probably capable of considerable exploitation; worthy of serious prospecting.

4 Outwash areas thickly covered with sand ridges and dunes; probably capable of exploitation; worthy of serious prospecting.

5 Outwash areas covered with alluvial silt, marl, muck, etc.; possibly capable of exploitation; worthy of serious prospecting.

6 Areas of outwash and till closely associated; possibly contains deposits capable of exploitation; worthy of prospecting.

7 Area of outwash mantling till; contains deposits possibly capable of exploitation; locally barren; worthy of preliminary prospecting.

8 Area of ridges of till and gravel mantled with sand; possibly contains deposits capable of exploitation; requires careful prospecting.

9 Sand dune areas.

10 Till (Illinoian) barren of gravel.

11 Till (Wisconsin); may contain pockets, lenses, and hills of gravel, probably capable of only local development.

12 Till, heavily mantled with silt.

13 Till, less heavily mantled with silt.

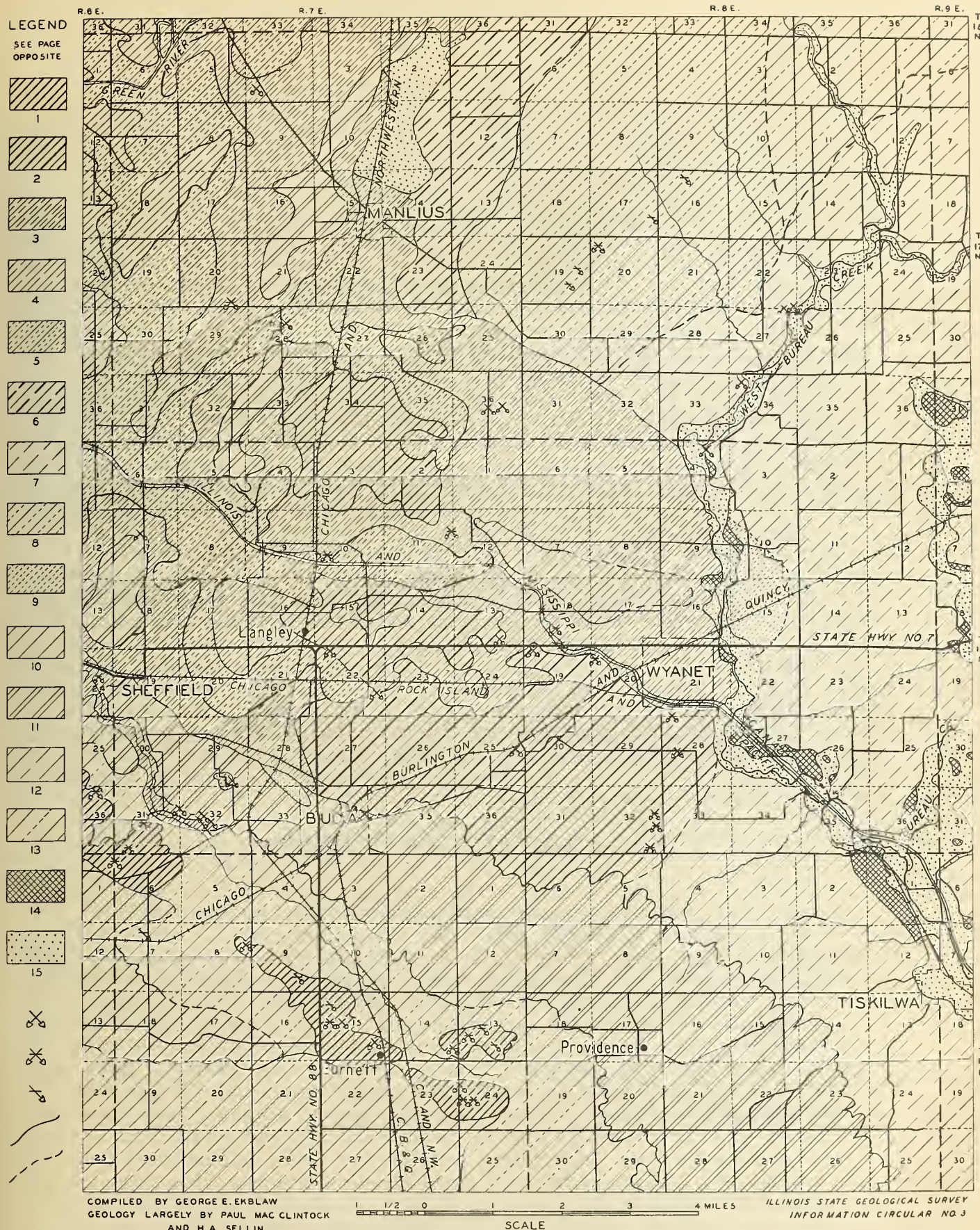
14 Terraces; may contain material capable of exploitation; worthy of preliminary prospecting.

15 Alluvium; not recommended even for prospecting along creeks; area near Manlius may be worthy of preliminary prospecting.

Crossed shovels indicate an operating pit; crossed shovels with a bar indicate an abandoned pit of considerable size; and a single shovel with a bar indicates a small local abandoned pit.

Solid lines are used for boundaries between areas where the change, whether definite or not, is reasonably well established; broken lines are used where the change cannot be determined or where there is a continuous, unseparable transition.

Roads are shown by straight, solid lines; State highways are shown by heavier lines.



PRELIMINARY AREAL MAP OF BUDA QUADRANGLE

SHOWING

DISTRIBUTION OF SAND AND GRAVEL

GEOLOGICAL RESUMÉ

All of the Buda quadrangle except a few small spots along streams in the vicinities of Sheffield and Tiskilwa, where erosion has exposed bedrock, is covered with glacial drift. The drift consists of (1) till, a heterogeneous mixture of all kinds and sizes of materials which were gathered up by the glaciers as they moved outward from Canada and which were deposited in place as the glaciers melted, and (2) gravel and other more or less well assorted material derived from the melting glaciers and deposited from the streams of water whose source also was the melting glaciers. The gravel was deposited as (a) pockets and lenses in the till, (b) more or less irregular hills, in which the gravel is more or less well assorted or mixed with till, (c) fans or aprons in front of the glaciers, (d) plains extending far from the glacier, and (e) fillings of former valleys through which the glacial waters escaped. Most of the drift covering the quadrangle was deposited from the latest, or Wisconsin, series of glaciers. The drift in a small area in the southwest corner of the quadrangle was deposited from an older glacier, the Illinoian, and part of it is deeply covered by silt washed from the Wisconsin glacier.

Subsequent to melting of the last glacier that covered the Buda quadrangle wind has blown much of the outwash sand into dunes and ridges and has mantled the whole area with dust or loess that it derived from the plains; streams have carved their present valleys; alluvium has collected along streams and in hollows; and soil has been generally developed. In the case of Bureau and West Bureau creeks it appears that their valleys were once carved out, then partly filled with material probably derived from glaciers lying east of the quadrangle, and finally mostly reexcavated, leaving remnants of the filling as terraces along the sides.

AREAS OF SAND AND GRAVEL

The area covered by the Buda quadrangle has been subdivided (Fig. 1) according to the type of drift deposits and their importance as regards assured or potential sand and gravel resources. In many respects the subdivision is arbitrary and artificial, as in most cases one type of deposit grades into others in all directions. Furthermore, no study of the area has provided data sufficient for limiting definitely any particular area of sand and gravel. Such limitations can be ascertained only by thorough testing. Consequently the map can be used only as a guide to (1) areas in which gravel deposits are general and prospecting is needed only to determine (a) thickness of overburden, (b) thickness of gravel, (c) character of gravel, and (d) general conditions for excavation; (2) areas in which prospecting will be required to locate and delimit deposits worthy of utilization; and (3) areas in which there are none or so few deposits that prospecting would be futile.

I. Gravel Hills

Hills composed wholly or largely of gravel comprise a more or less continuous irregular ridge south and west of Buda. This ridge trends northwesterly from sec. 24, T. 15 N., R. 7 E., across secs. 23, 14, 15, 16, 10, and 9 into sec. 8, beyond which a gap extends to sec. 6, and thence the ridge extends again northwesterly across sec. 6, T. 15 N., R. 7 E., sec. 1, T. 15 N., R. 6 E., sec. 31, T. 16 N., R. 7 E., and secs. 36 and 25, T. 16 N., R. 6 E. A group of related hills occupies portions of secs. 13 and 14, T. 15 N., R. 7 E. These gravel hills are a part of early Wisconsin drift and appear to represent gravel washed out and deposited as an apron immediately at the front of the glacier at an early position during its recession. The almost universal occurrence of gravel in the hills is demonstrated by the numerous pits that have been opened in them and by exposures of gravelly material at every favorable point. At many places till is associated with the gravel, and in the large pit at Burnett till underlies the gravel.

The aggregate material consists mainly of coarse sand and fine gravel, with very few cobbles and uncommon boulders. Much of it is quite clean, but some of it contains so much clay that it requires washing. Most of the material is well sorted, and ranges from sand to coarse gravel. Most of the gravel is loose, but locally it is firmly cemented with calcium carbonate. All kinds and varieties of rock are found in the gravel. The overburden consists of loess and varies greatly in thickness, reaching a maximum of at least 8 feet.

The principal commercial pit in the Buda quadrangle is situated in the gravel hill area in the SE. corner of sec. 15, T. 15 N., R. 7 E., at Burnett Switch on the Chicago, Burlington, and Quincy Railroad. It has been exploited for many years and a daily average of several carloads of prepared material are shipped from the plant. Another important pit is located in the center of the W. 1/2, sec. 15, T. 15 N., R. 7 E., and from it has been and is obtained much of the gravel used for surfacing the township roads. No equipment for preparing the gravel is available at this pit. Many other local pits, some worked intermittently and others apparently abandoned, have been opened in the gravel hills.

II. "Broken Country"

An irregular association of hills and small plain areas that can be best described as "broken country" occupies three considerable areas north and east of Buda. The largest of these lies between the Buda ridge and Pond Creek and extends from Buda to Wyanet. The second area lies between Pond Creek and Illinois and Mississippi Canal, and the third lies between the canal and Manlius. In these areas there occurs a complicated intermixing of gravel and till in the glacial hills, and intermingled with the hills are small plains which may be composed either of gravel or till.

The character of the gravel is variable and differs at separate localities. At some places it is coarse and contains a considerable proportion of oversize; at others it is fine and sandy with very little oversize. Again at some places it is clean and at others it contains silt and masses of pink till clay. Pink till overlies, underlies, or is interbedded with the gravel. All of the hills and many of the plains are mantled with loess, but some of the plains are covered with alluvial material. The overburden of alluvium, loess, or till varies from 0 to 10 feet.

A pit in the NE. corner, NW. 1/4 NW. 1/4, sec. 22, T. 16 N., R. 7 E., is situated in the west side of a hill and exposes 12-15 feet of fine gravel and sand. There is little oversize and only a very few boulders lie in the pit. Pink till overlies the gravel. Another pit in the NE. corner of the SE. 1/4 of the same section is also situated on a hill and exposes 8 feet of fine gravel with a few small boulders. The overburden consists of 3 feet of loess. Pink till is exposed in parts of the pit. In a road-cut across a flat-topped hill in the SW. corner of sec. 13, T. 16 N., R. 7 E., 8-10 feet of pink till with lenses of silt and gravel overlies 5-6 feet of sand and gravel which extends down into the hill an undetermined distance. The commercial pit on the south side of Pond Creek near the SW. corner of sec. 21, T. 16 N., R. 8 E., south of Wyanet, exposes 30 feet of sand and gravel overlying pink till. The gravel contains a considerable proportion of cobbles and boulderets and is locally cemented. Till boulders occur in the sand beds. A pit in the NE. corner of the NW. 1/4, SW. 1/4 sec. 28, T. 16 N., R. 8 E., is situated in a flat area and exposes 10 feet of fine gravel and sand covered with 1-4 feet of leached silt that appears to be only weathered gravel.

The abundance of pits and exposures indicate that there is a large amount of gravel in the "broken country" areas. However, its occurrence and association with till is so irregular that careful and thorough prospecting with test-holes will be required to locate all of the individual gravel deposits, to determine their thickness, character, quality, and association with till, and to delimit the bounds of each deposit.

III. Areas of Outwash

Most of the central and northwestern parts of the Buda quadrangle consist mainly of gravel, sand, and silt washed out from the glaciers of Wisconsin age and deposited in plains that surround the elevated areas and extend to the west and northwest far beyond the quadrangle. On the map (Fig. 1) the outwash area is subdivided into (1) areas of outwash with normal overburden of silt, (2) areas of outwash covered with sand dunes, (3) areas of outwash covered with alluvium, (4) areas of outwash associated with till, and (5) areas of outwash overlying till, in order to show certain modifications that may affect exploitation. The boundaries between these subareas should not be considered as definite, as the areas all grade into each other and each area may contain small areas of the others.

Most of the material in the outwash is clean, fine gravel and coarse sand with very little oversize. However, where the outwash approaches the till ridges it becomes much coarser and grades into till through interbedding and interlensing. Apparently the material also becomes coarser in the lower part of the outwash and finer at the top, so the principal overburden is outwash silt 3-4 feet thick. However, the lower parts which served as channels for the glacial waters are now more or less filled with silt, muck, and other alluvial deposits, and in the higher areas between the channels, dunes and ridges of sand have been built by wind action. It also appears that to the east the outwash becomes thinner and more irregular in its distribution.

A large pit in the center of the NW. 1/4 SW. 1/4 sec. 10, T. 16 N., R. 7 E., exposes about 15 feet of fine gravel (20 per cent) and coarse sand (80 per cent) with practically no oversize. The overburden consists of loess or silt 3-5 feet thick. A small pit in the center of the SW. 1/4 sec. 4, T. 17 N., R. 7 E., exposes 4 feet of fine gravel and sand with an overburden of loess-like loam 3-4 feet thick. A pit in the center of sec. 32, T. 16 N., R. 7 E., is situated in the northwest end of a flat-topped ridge of gravel and exposes 6-8 feet of clean sand and fine gravel with only 1-2 per cent of oversize. The overburden is 3 feet thick. The vicinity of this pit is reported to be underlain with gravel, and there are several nearby pits, in one of which ledges of cemented gravel appear. A pit in the SE. corner of the NE. 1/4 NW. 1/4 sec. 28, T. 17 N., R. 7 E., exposes very poorly sorted gravel with much sand and oversize, including numerous large boulders. The gravel lies on till and pink sandy till occurs in the east part of the pit. The overburden consists of alluvial sand about 3 feet thick. The coarseness and poor assortment of the gravel and its close association with till demonstrates that it must have been deposited near the glacial margin.

A pit operated mainly for material for township roads and located in the NW. 1/4 NW. 1/4 sec. 34, T. 17 N., R. 8 E., exposes several feet of gravel, the upper 5 feet being medium and well-sorted and grading down into finer material. It is overlain by 10 feet of loess. At many places along the banks of both Bureau and West Bureau creeks there is exposed a general downward succession of (a) 2-3 feet of soil, (b) 8-10 feet of sandy silt, (c) about 15 feet of coarse sand and fine gravel, generally coarser near the bottom, and with some beds of till, and (d) pink till. Several local pits are situated in this type of deposit.

The general topography of the region covered by outwash and the numerous pits in it are evidence of the general distribution of sand and gravel. However, there are not many data regarding its thickness, an important factor that can be determined satisfactorily only by test-holes. In the areas covered by alluvium or by sand dunes, test-holes will also have to be made to determine thickness of overburden. In the east part of the outwash region, especially in that area designated as till mantled by outwash, it is probable that the gravel is erratically

distributed, and careful prospecting with test-holes is recommended before any major exploitation is undertaken.

IV. Till and gravel ridges, mantled with sand

The ridge east of Manlius consists of till and gravel disposed in ridges that trend southeast-northwest, all mantled more or less deeply with sand which extends also over the adjacent areas. Gravel occurs in some of the ridges as shown by some pits and by some exposures in road cuts, but it has not been determined whether all or only some of the ridges contain gravel. There are also small pits in the sand cover. Consequently this area deserves some careful inspection and prospecting.

V. Sand dunes

The three small areas of sand dunes north of Buda and the large area northeast of Wyanet are not the only areas where dunes occur, as sand dunes and ridges are commonly to abundantly distributed over all of the outwash areas and also over the ridged areas east of Manlius, but they are the only areas in which the wind-blown sand appears to be more or less isolated from other possible gravel resources. "Diggings" to secure local supplies of sand are numerous, but only two pits--one in the SE. 1/4 sec. 29 and the other near the center of sec. 34, T. 16 N., R. 7 E.--are of any size. The sand is quite fine and silty. It may have considerable possibilities as molding sand, and the same is true for the sand occurring over the other areas.

VI. Areas of till

The small area of Illinoian till in the southwest corner of the quadrangle appears to be completely barren of sand and gravel. The high ridge of Wisconsin till that trends southeast-northwest across the south part of the quadrangle and the isolated ridges in the northwest part may contain isolated pockets, lenses, or hills of gravel, but they are so infrequent or so small that they would have to be sought carefully and probably would warrant no exploitation except for local uses.

VII. Areas of till mantled with silt

In both the southwest and northeast corners of the Buda quadrangle there are areas of till more or less heavily mantled with silt. The till in the southwest area belongs to both the Illinoian and the Wisconsin drifts, the boundary between them being concealed by the silt but probably extending from the east extremity of the Illinoian till area southwest and south across

secs. 20 and 30, T. 15 N., R. 7 E., and the till in the northeast area is all Wisconsin drift. The silt is fine outwash derived from the Wisconsin glaciers and covers the areas to a depth exceeding 15 feet. A definite ridge of sandy material runs nearly east-west across the southwest area along the extreme south edge of the quadrangle.

The silt, especially the leached part, may be worthy of consideration for use as molding sand, especially in view of its wide distribution and thickness. It is possible that in that portion of the areas underlain by Wisconsin drift, deposits of gravel worthy of exploitation may occur but they can be revealed only by test-holes.

VIII. Terraces

Terraces along West Bureau and Bureau creeks appear to be remnants of a former valley-fill probably derived from glaciers lying east of the Buda quadrangle. There are no exposures in them but as the material is believed to be gravel, the terraces seem worthy of some prospecting.

IX. Alluvium

Alluvium occurs in narrow belts along Bureau and West Bureau creeks and also in a broad plain at the headwaters of Hickory Creek north of Manlius. The alluvium along Bureau and West Bureau creeks represents recent deposits from those streams. It may contain local pockets or lenses of sand or gravel, but most of it is probably only silt mixed with too much organic material to be of value. It is also possible but improbable that the alluvium overlies gravel of outwash or valley-fill origin. The alluvial plain at Manlius may well be underlain by outwash gravel, but this possibility must be verified by test-holes.

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The topographic map of the Buda quadrangle, prepared in cooperation with the United States Geological Survey, may be obtained for ten cents a copy from the Illinois State Geological Survey.